which and your eye, the rising smoak of some Chimney is interpos'd; which brings into my mind what I had once the opportunity to observe, which was, the Sun rising to my eye just over a Chimney that sent forth a copious steam of smoak; and taking a short *Telescope*, which I had then by me, I observ'd the body of the Sun, though it was but just peep'd above the Horizon, to have its underside, not onely flatted, and press'd inward, as it usually is when neer the Earth; but to appear more protuberant downwards then if it had suffered no refraction at all; and besides all this, the whole body of the Sun appear'd to tremble or dance, and the edges or limb to be very ragged or indented, undulating or waving, much in the manner of a flag in the Wind.

This I have likewise often observ'd in a hot Sunshiny Summer's day, that looking on an Object over a hot stone, or dry hot earth, I have found the Object to be undulated or shaken, much after the same manner. And if you look upon any remote Object through a *Telescope* (in a hot Summer's day especially) you shall find it likewise to appear tremulous. And further, if there chance to blow any wind, or that the air between you and the Object be in a motion or current, whereby the parts of it, both rarify'd and condens'd, are swiftly remov'd towards the right or left, if then you observe the Horizontal ridge of a Hill far distant, through a very good *Telescope*, you shall find it to wave much like the Sea, and those waves will appear to pass the same way with the wind.

From which, and many other Experiments, 'tis cleer that the lower Region of the Air, especially that part of it which lieth neerest to the Earth, has, for the most part, its constituent parcels variously agitated, either by heat or winds, by the first of which, some of them are made more rare, and so suffer a less refraction; others are interwoven, either with ascending or descending vapours; the former of which being more light, and so more rarify'd, have likewise a less refraction; the latter being more heavie, and consequently more dense, have a greater.

Now, because that heat and cold are equally diffus'd every way; and that the further it is spread, the weaker it grows; hence it will follow, that the most part of the under Region of the Air will be made up of several kinds of *lentes*, some whereof will have the properties of *Convex*, others of *Concave glasses*; which, that I may the more intelligibly make out, we will suppose in the eighth *Figure* of the 37. *Scheme*, that A represents an ascending vapour, which, by reason of its being somewhat *Heterogeneous* to the ambient Air, is thereby thrust into a kind of Globular form, not any where terminated, but gradually finished, that is, it is most rarify'd in the middle about A, somewhat more condens'd about B B, more then that about C C; yet further, about D D, almost of the same density with the ambient Air about E E; and lastly, inclosed with the more dense Air F F, so that from A, to F F, there is a continual increase of density. The reason of which will be manifest, if we consider the rising vapour to be much warmer then the ambient heavie Air; for by the coldness of the ambient Air, the shell E E will be more refrigerated then D D, and that then C C, which will be yet more then B B, and that more



more then A; so that from F to A, there is a continua
and consequently of rarity; from whence it will neces
the Rays of light will be inflected or refracted in it,
ner as they would be in a *Concave-glass*; for the Rays
be inflected by *G K H*, *G K H*, which will easily follo
fore explained concerning the inflection of the *Atmosph*

On the other side, a descending vapour, or any part o
by an ascending vapour, will exhibit the same effects wi
for, if we suppose, in the former Figure, the quite contra
that last describ'd; that is, the ambient Air F F being
part of that matter within any circle, therefore the
necessarily be A, as being fartherst remov'd from t
intermediate spaces will be gradually discriminated b
mixture of heat and cold, so that it will be hotter at E
D D then C C, in C C then B B, and in B B then A. F
refraction and condensation will follow; and conseq
greater refraction, so that every included part will refr
including, by which means the Rays, G K I, G K I, con
or some remote Object, are so inflected, that they will
meet, in the point M. By the interposition therefore o
vapour the visible body of the Star, or other Object, i
mented, as by the former it was diminished.

From the quick consecutions of these two, one after
the Object and your eye, caused by their motion upwar
proceeding from their levity or gravity, or to the righ
ing from the wind, a Starr may appear, now bigger, no
it would otherwise without them; and this is that p
which is commonly call'd twinkling, or scintillation.

The reason why a Star will now appear of one colou
which for the most part happens when 'tis neer the H
easily be deduc'd from its appearing now in the midd
other whiles neer the edge; for if you look against th
with a *Telescope* that has a pretty deep *Convex* Eye-gla
that the Star may appear sometimes in one place, and son
of it; you may perceive this or that particular colour t
in the apparent Figure of the Starr, according as it is m
from the middle of the *Lens*. This I had here further
it does more properly belong to another place.

I shall therefore onely add some few Quæries, which
of these particulars hinted, and so finish this Section.

And the first I shall propound is, Whether there ma
artificial transparent body of an exact Globular F
inflect or refract all the Rays, that, coming from one p
*Hemisphere* of it; that every one of them may meet on
and cross one another exactly in a point; and that it m
with all the Rays that, coming from a *lateral* point, fa
*Hemisphere*; for if so, there were to be hoped a perfec